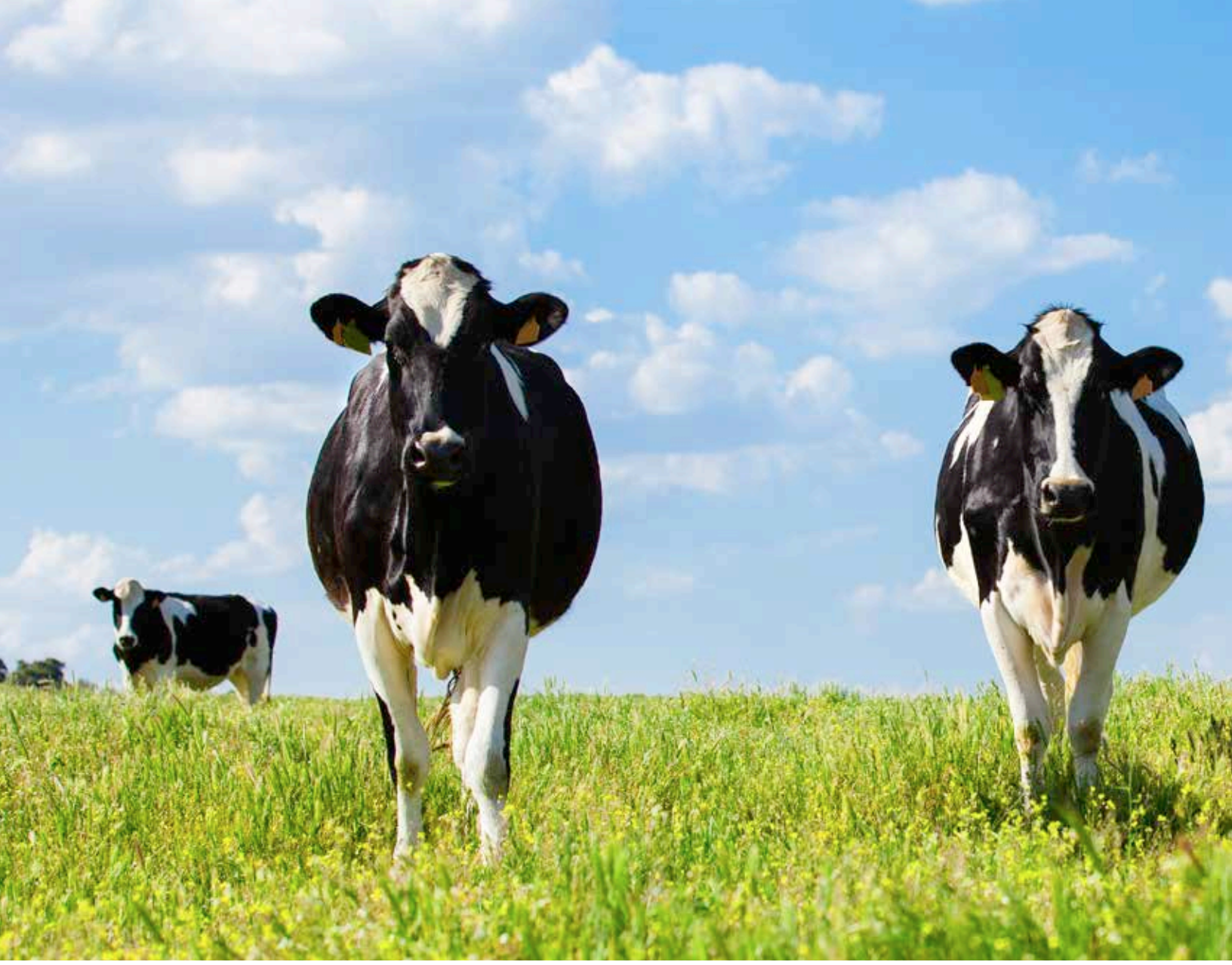

Water Quality Guide for Dairy Sustainability in the Chesapeake Bay

An Open-Source Road Map for Cooperatives and Processors

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An Open-Source Road Map for Cooperatives and Processors

Author

Suzy Friedman
Environmental Defense Fund

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The complete report is available online at edf.org/dairysustainability.
Links in this report were current as of November 2018.

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Introduction

Protecting and strengthening the role that dairy farmers, cooperatives, processors and retailers play in their communities depends on the industry's ability to overcome a number of challenges, including difficult economics and water quality concerns.

The dairy industry is a critical part of the landscape, economy and social fabric of the Chesapeake Bay. Protecting and strengthening the role that dairy farmers, cooperatives, processors and retailers play in their communities depends on the industry's ability to overcome a number of challenges: difficult economics, continued water quality concerns locally and in the Chesapeake Bay, fears of further regulatory restrictions, negative portrayals in the media, and buyer and consumer pressure to make sustainability improvements.

Moving forward proactively on sustainability offers the dairy sector a way to address these challenges, improve environmental and economic performance, and become more resilient.

Diving into sustainability can be challenging, so this guide offers a road map to help dairy cooperatives and processors in the Chesapeake Bay develop and implement strategies to create business value by improving water quality outcomes.

A key goal of this guide is to ensure that cooperatives and processors of any size have access to guidance to improve water quality for economic and environmental value, even if they do not have the resources to hire expert consultants to lead them through the process.

Every dairy cooperative and processor is unique, as is each dairy farm. This guide lays out the common steps and lessons dairy cooperatives and processors can use as the foundation for creating their own sustainability initiatives tailored to their specific situation and strengths. Many of the steps and lessons captured in this guide are applicable in other dairy production regions as well. We hope it can be useful to dairy cooperatives and processors outside of the Chesapeake Bay. The details about experts, sources of assistance and applicable regulations included in this guide, however, are specific to Pennsylvania, Maryland and Virginia.

It is not an easy time to be in the dairy business, given the difficult margins in dairy production. Milk prices are very low, and an abundance of milk has created significant challenges for dairy farmers. This economic situation makes movement on sustainability even more important for building marketplace relationships, improving yield resilience and capitalizing on efficiency opportunities. When the current milk price is below the estimated breakeven cost of production—$19–20/hundredweight (cwt)—accessing cost-share and additional financial incentives to help farmers is especially important.

People are critical to moving your company forward on supply chain water quality, but this does not mean you need to hire more staff. You will need people to advise, guide and manage

What is an open-source water quality guide?

Open-source: Makes information and resources available to an entire industry rather than just larger companies that have greater resources and staff dedicated to sustainability.

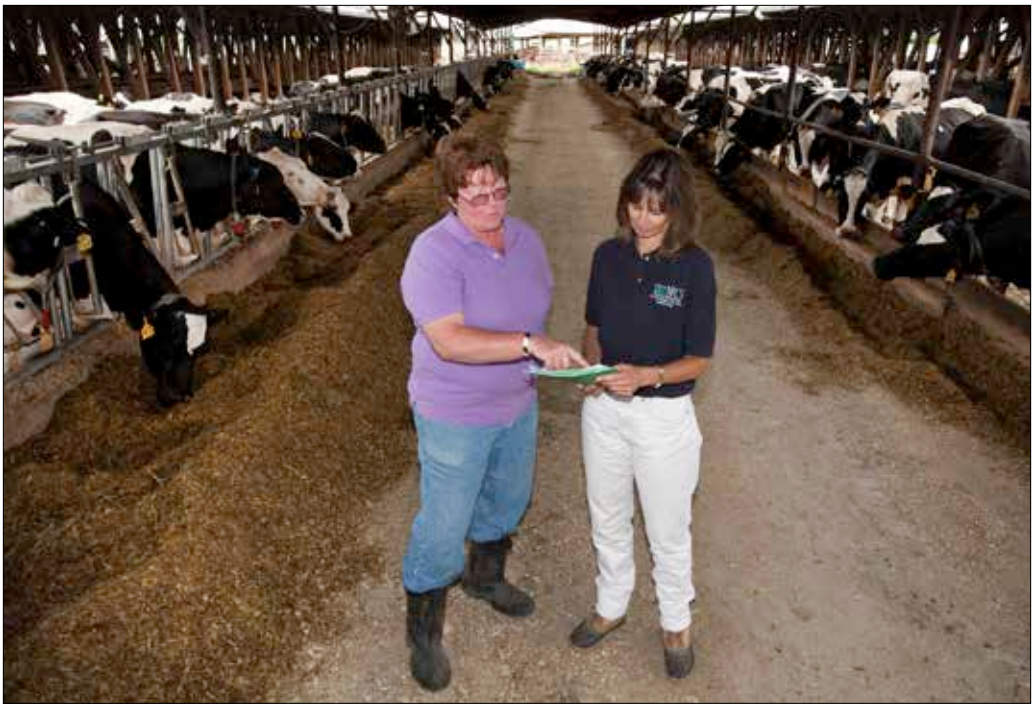
Water quality guide: Provides structure on how to approach developing and implementing a program to improve water quality for business value.

the work, but these people can be staff, consultants or partners. Having sustainability experts on staff has the benefit of bringing this capacity inside, but you can make meaningful progress working with quality consultants or non-governmental organizations. These can include non-governmental conservation organizations such as Environmental Defense Fund, Alliance for the Chesapeake Bay, The Nature Conservancy and Lancaster Farmland Trust; grower and industry associations such as PennAg Industries, Center for Dairy Excellence or National Milk Producers Federation; or science organizations such as the Stroud Water Research Center and land-grant universities/Extension Services.

A critical factor for success on the ground will be connecting to, and working with, the farm adviser and conservation experts known and trusted by your own staff and your supplying or member farmers. To avoid confusion when talking about other kinds of experts and advisers, we call those working directly with farmers to provide technical advice and implementation assistance to farmers "ag service professionals." These trusted ag service professionals will be essential for assessing and making changes on the farm, sustaining practices for full value, and evaluating what those practices mean for the farm's economics and financial planning. Ag service professionals include agronomists, such as crop or ag consultants; resource conservation specialists, such as conservation districts, U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) and Extension Services, or a consultant; ag retailers; and nutritionists. Additional advisers include the farmer's banker and accountant. Information later in the guide details how to identify and connect to these ag service professionals.

This guide looks comprehensively at the important steps dairy processors and cooperatives must take to act on water quality—from organizational or corporate goal setting, commitments and policies, to creating an implementation program to engage farmers and ag service professionals in making the changes that will improve water quality and resilience. Both components are critical for success.

While there are a number of other dairy and ag industry-wide sustainability guides and frameworks, this guide is focused on helping dairy processors and cooperatives address the specific challenge of improving water quality in ways that will create business value. Cooperatives and processors can use this water quality guide in conjunction with guides



Who is the audience and target for this open-source water quality guide?

Geography: The target geography for this open-source water quality guide is the Chesapeake Bay, and in particular, Pennsylvania, Maryland and Virginia. We have focused on this geography given the intense and chronic water quality challenges in the region and the growing pressure on agriculture, including dairy, to play a leading role in improving water quality locally and in the Bay itself.

Audience: This guide is for processors and cooperatives serving dairy farms. They are a linchpin in making sustainability progress in the dairy sector in the Chesapeake Bay because of their strong and direct relationship with the majority of dairy farmers in the region. To succeed in making production systems that improve water quality a business norm, the dairy cooperatives and processors in the region need the tools and the capacity to guide and support action by dairy farmers and to communicate sustainability plans and actions across the supply chain to their buyers and consumers.

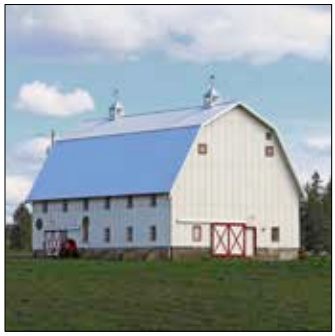
Priority sustainability issue: Water quality is the dominant environmental sustainability challenge for the agricultural sector and communities in the Chesapeake Bay. Making progress on water quality requires economic sustainability as well, so we have created this guide with an intentional focus on the economic value of improving water quality.

that focus on other aspects of sustainability. In addition, many of the activities laid out in this water quality guide have significant co-benefits for other important aspects of sustainability, such as reducing greenhouse gas emissions or improving habitat.

Three leading examples are resources developed by the Innovation Center for U.S. Dairy and National Milk Producers Federation, which addresses greenhouse gas emissions and energy use; the National Council of Farmer Cooperatives, which created an online field guide on sustainability for cooperatives, and Field to Market, which offers metrics for key resource outcomes for row crop production.

As you use this water quality guide, EDF is available to answer questions or help walk you through the steps. If you would like to discuss the guide, how to get started or receive additional guidance, please contact Suzy Friedman at sfriedman@edf.org.

1. Why dairy cooperatives and processors should tackle water quality



Being proactive in addressing one of the most pressing sustainability issues in the region—water quality—is important for the near- and long-term wellbeing of the dairy industry, the communities that depend on the sector and the quality of the region's natural resources.

Dairy cooperatives and processors are a critical connector between those who buy dairy products—grocery stores, distributors and consumers themselves—and dairy farmers and their advisers managing the land and cows. This position in the dairy supply chain means cooperatives and processors are the ones dairy buyers, whether a food company, restaurant or grocery store, look to for answers on sustainability at the farm level. Dairy buyers are under growing pressure to answer consumer questions about how and where their food is produced, and developing a compelling story on environmental sustainability is a big part of addressing this growing consumer interest.

On the other hand, dairy cooperatives and processors are the ones many dairy farmers look to for answers about what the marketplace wants and requires and how to manage broader pressures from regulators and the community. Many farmers have implemented conservation measures, such as conservation tillage, cover crops and improved nutrient management. Dairy cooperatives and processors can play a critical role in encouraging and enabling farmers to continue and accelerate implementation of conservation practices, as well as reporting these sustainability efforts for marketplace value. At stake is the industry's ability to advance meaningful solutions to water quality challenges, realize economic value from sustainability, meet growing demand for corporate stewardship by consumers and the supply chain, and tell the story of agriculture to the community, locally and far beyond.

The dairy industry itself has recognized and prioritized sustainability. As called out by the Innovation Center for U.S. Dairy, "In today's marketplace, sustainability is a new indicator of quality. Consumer brands, retailers, financial institutions and customers are increasingly evaluating environmental, social and economic indicators as benchmarks of performance." While the dairy industry is developing resources to advance sustainability on greenhouse gases and energy use on dairy farms, it has highlighted Field to Market as the metrics it will use for crop production instead of developing its own.

Many companies along the supply chain have evolved from viewing conservation as philanthropic projects tangential to their business to integrating sustainability into their ongoing business practices. There can be significant and long-term value in a shift from supporting occasional conservation projects to integrating sustainability into your business operations. Sustainability that becomes a part of how your company operates brings value to your bottom line, reputation and resilience.

Many companies have learned that the benefits of integrating sustainability into their businesses is not theoretical; they are real. For example, Smithfield Foods, which purchases significant amounts of grain to feed its hogs—about 7.9 million pounds of grain per year, valued at $1.7 billion—initiated a program in cooperation with farm grain suppliers to help them improve nutrient and soil management. Smithfield Foods set a goal of engaging 75 percent of its grain sourcing supply, about half a million acres, in sustainable farming practices by 2018. Even using conservative estimates, EDF estimates that Smithfield's

sustainable grain program could yield a return of 15 times the annual cost of the program and could generate in excess of $4 million annually in net benefits.

The Smithfield example has a lot to offer as a model for dairy cooperatives and processors. Like dairy cooperatives and processors, Smithfield Foods has a complex supply chain that includes hog operations and grain farmers outside their direct control. Smithfield needed to understand its geographic and environmental footprint in order to get started. Most important, because Smithfield does not work directly with or mandate certain management approaches from its hog or grain farmers on a number of environmental issues, the company needed to work with and through the farm advisers trusted by hog farmers and feed grain producers in its supply chain.

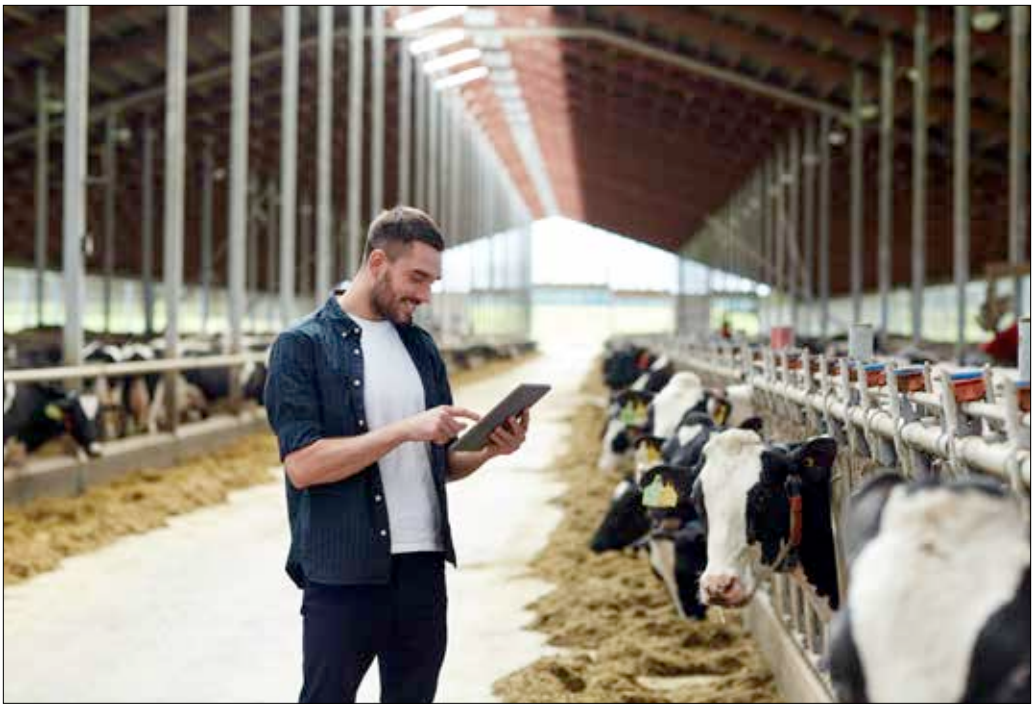
Many other food and agriculture companies are making commitments and implementing programs to improve the sustainability of their supply chains. These include Unilever, Campbell Soup Company (which is working in Pennsylvania, among other states, to improve the sustainability of the wheat it sources for its Goldfish product), Kellogg's, PepsiCo, Danone, Land O'Lakes, General Mills, McDonalds, Tyson and Perdue, among others.

Integrating sustainability into your business can have a variety of very important benefits.

Economics: As illustrated by the Smithfield Foods example, developing and implementing strategies to address resource concerns can deliver direct economic value. This can come from identifying opportunities to improve resource use efficiency and reduce waste or loss, increasing productivity through new precision ag or other higher performing practices or technologies, and increasing crop, land and business resilience to weather extremes.

There can be significant and long-term value in a shift from supporting occasional conservation projects to integrating sustainability into your business operations.

Market positioning and relationships: A growing number of consumer-facing retailers and food companies are making sustainability commitments, due to increasing demands from consumers. As reported by the *Harvard Business Review*: "Today's consumers expect more transparency, honesty and tangible global impact from companies, and can choose from a raft of sustainable, competitively priced, high-quality products." News coverage regarding environmental and social responsibility has a significant impact on consumer decision-making when it comes to food, so having a strong story to tell on sustainability can be a business boon. Having a good sustainability plan in place to address the most pressing issues for your footprint,



which in the Chesapeake Bay is water quality, is becoming increasingly important to maintain and strengthen relationships with buyers, as well as to bolster the resilience and long-term productivity of the farmers supplying your milk.

Regulatory and legal concerns: Risks from regulations or potential lawsuits are seldom far from the minds of many in agriculture. Requirements under the Chesapeake Bay Total Maximum Daily Load (TMDL) for water quality imposed by the U.S. Environmental Protection Agency (EPA) have increased state requirements for conservation measures by the region's farmers. Experiences in other parts of the country only reinforce these concerns—new buffer and fertilizer laws in Minnesota, new fertilizer regulations in Ohio and a lawsuit filed by Des Moines Water Works against farmers in three upstream counties. Having an authentic sustainability program in place to address water quality issues can mitigate risk and manage regulatory burdens by fixing the problem at its source. Implementing business-smart solutions that reduce nutrient and soil impacts to water and documenting that progress will show agriculture is a key part of the solution.

Community and public perception: In order to counteract negative perceptions, dairy cooperatives and processors, along with others in the food and ag supply chain, can make sustainability commitments and show they are accountable through transparent reporting. Having a strong story to tell about how your dairy business contributes value to the community, providing both nutrition and environmental benefit, is the best way to improve public perception within the community and region.

A detailed assessment by McKinsey reinforces these business values of sustainability: "Our conclusion: sustainability programs are not only strongly correlated with good financial performance but also play a role in creating it." McKinsey found that companies with high ratings for environmental, social and governance factors have a lower cost of debt and equity, and companies with high environmental, social and governance ratings outperform the market both in the near term—three to five years, and in the longer term—five to ten years.

SECTION SUMMARY

The supply chain, including dairy, is under growing pressure to answer consumer questions about how and where their food is produced. Developing a compelling story about environmental sustainability is a big part of addressing this growing consumer interest. This means tackling sustainability and water quality in the Chesapeake Bay is a growing imperative for dairy cooperatives and processors.

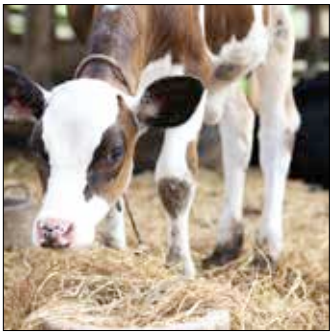
Dairy cooperatives and processors can and should encourage and help farmers to continue and accelerate implementation of conservation practices and report on these sustainability efforts for marketplace value.

At stake is the industry's ability to advance meaningful solutions to water quality challenges, realize economic value from sustainability, meet growing demand for corporate stewardship by consumers and the supply chain, and tell the story of agriculture to the community, locally and far beyond

The dairy industry has recognized and prioritized sustainability. As called out by the Innovation Center for U.S. Dairy, "In today's marketplace, sustainability is a new indicator of quality."

Many companies have learned the benefits of integrating sustainability into their businesses. These include Smithfield, Unilever, Campbell Soup Company (which is working in Pennsylvania, among other states, to improve the sustainability of the wheat it sources for its Goldfish product), Kellogg's, PepsiCo, Danone, Land O'Lakes, General Mills, McDonalds, Tyson and Perdue, among others.

2. Steps to water quality sustainability for dairy cooperatives and processors



Every company and every farm is different. Sustainability is not static, but a journey of continuous improvement.

The following detailed explanations, tables and links provide a guide through the key steps in developing, implementing and getting business value from a sustainability program for water quality. Every company and every farm is different, so sustainability is not static, but a journey of continuous improvement. The process of continuous improvement includes assessing where you are, what needs to be improved, making improvements and evaluating what comes next to continue to refine for business and water quality outcomes, whether at the cooperative and processor level or at the farm level.

Steps 1–3 focus on cooperatives and processors, while steps 4–6 focus on farmer engagement.

STEP 1. Determine your starting point (cooperative- or processor-focused step)

Getting started is often the hardest step. The first step is to analyze existing sustainability efforts and key attributes across the sourcing area—the area or areas where you source your milk or the area where your member dairy farmers are located.

Identify your sourcing footprint, or your dairy production region and feed grain sourcing region. (Suggested timeframe: one to four months)

Create a map showing sourcing area(s) for dairy farms and for feed grains purchased off-farm—watershed, county or other geographic boundaries encompassing main milk sourcing areas (location of sourcing dairies); and main millsheds or counties for feed grain sourcing (sourcing areas around main feed mills used by dairies in your sourcing regions). In the Chesapeake Bay, most dairy farms likely produce much of their own feed and forage, but still purchase at least a portion of their feed grains from off-farm.

Some tools for developing maps include Esri and Chesapeake Conservancy.

Establish a sustainability baseline for key water quality measures. (Suggested timeframe: three to six months)

Establishing a baseline helps track where you have been and allows you to demonstrate progress to tell your story.

- Begin by consulting with your staff and trusted local experts (ag service professionals, USDA's NRCS, conservation districts, Extension or state agencies) to gather what data they have on the extent of conservation practices already in place by your member or supplying dairy farmers.
- To supplement this information, conduct a simple survey of your member or supplying farmers about what practices are in use that protect water quality and make yields more resilient to weather extremes. These practices can reduce supply risk across your sourcing regions.

- Information to gather in the survey:
  - Does the farm have required nutrient and soil management plans?
  - Is the farm implementing the nutrient and/or soil management plans?
  - What practices is the farm implementing to have the right rate, timing, form and placement of nutrients, both manure and commercial fertilizer (the 4Rs of nutrient stewardship)?
  - What soil health practices is the farm implementing, such as cover crops, reduced or no-till, and more diverse crop rotation (two or more crops in rotation)?
  - What field and stream protection practices is the farm implementing, such as buffers, filters and livestock exclusion stream fencing?
  - Has the farm ever participated in a conservation program through USDA's NRCS, a conservation district or state agency?
- The above questions focus on levels of awareness and adoption of the priority conservation measures outlined in the on-farm dairy water quality program provided by this guide, which includes assessing compliance with state required conservation plans.
- The PA Department of Agriculture is conducting a farmer best management practice (BMP) survey to capture more completely the hard work of farmers to date. Visit the PA Department of Agriculture website to see a sample survey.

Near-term milestones are important to break down longer-term goals into manageable pieces.

In addition, you can review USDA data on the levels of adoption of conservation measures in your grain sourcing area. It is important to note the date and extent of this data. Some helpful resources include:

- Assessment of the Effects of Conservation Practices on Cultivated Cropland in the Chesapeake Bay Region.
- Draft PA Farm Conservation Practice Inventory by Penn State University.

STEP 2. Identify goals and desired outcomes (cooperative- or processor-focused step)

Once you have figured out your starting point, the next step is to determine where you want to go.

Select a process to determine your goal and the outcomes you want

Based on the assessment of your starting point, work with your partners and solicit input from your member or supplying farmers to set the goals for your program. Proposed outcomes and metrics are included below for tracking progress on that goal. You may consider setting near-term milestones (one to two years), mid-term goals (three to five years) and a longer-term aspirational vision (ten or more years). The near-term milestones are important to break down longer-term goals into manageable pieces.

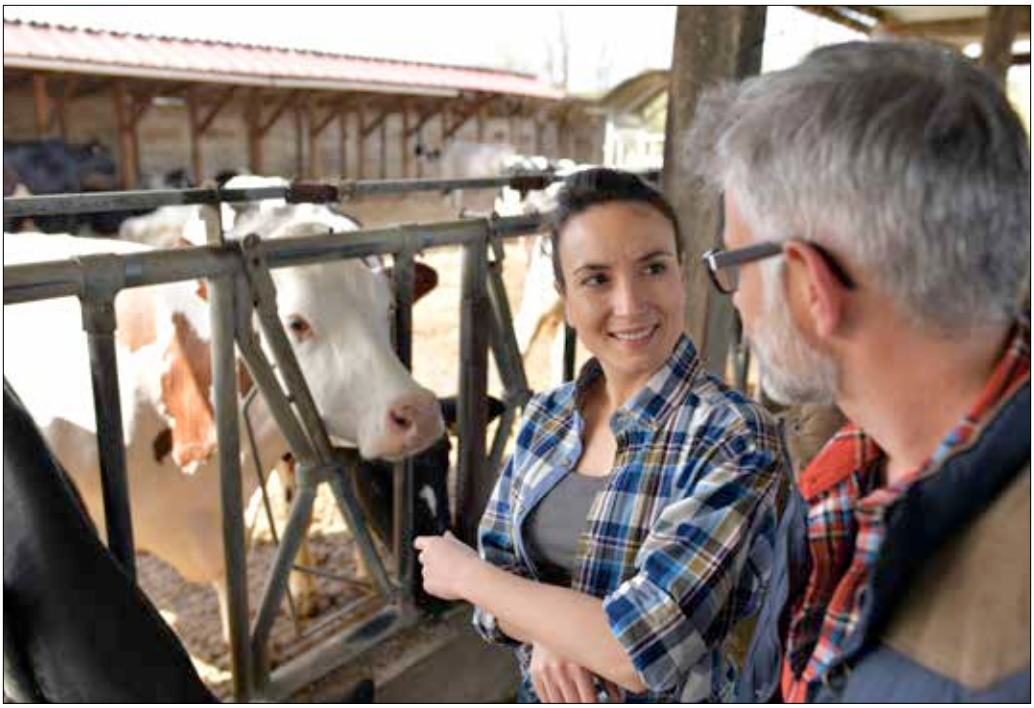
While the number of acres and farms participating in continuous improvement programs or plans is an important metric, you can enhance your success long-term by including outcome or performance metrics as well, such as a specific numeric reduction in nutrient loading (pounds of nutrients lost) to local waters goal or other similar outcome-based goal. Regardless of approach, we recommend you gather input from experts on your staff, dairy members or supplying farmers, Extension and university experts, conservation districts, state agencies, non-governmental organizations and/or industry advisers. Some examples of organizations that can provide guidance in setting outcome-based goals include Ceres and the National Academy of Sciences. Stroud Water Research Center has extensive expertise in watershed restoration science.

Have a conversation with your key audiences about what metrics under consideration are most meaningful to them.

Considerations in setting your goal

- Set goals specific to water quality outcomes for the Chesapeake Bay and specified within each state's watershed implementation plan. EPA has created milestones toward water quality goals broken down by state. The state tributary strategies for Pennsylvania, Maryland and Virginia lay out the needed reductions in nutrient loading for regions within the state based on tributaries.
  - Visit the Chesapeake Bay TMDL Tracker site for an interactive map that provides an overview of progress and remaining nutrient load reduction goals by state and watershed.
  - The state progress reports indicate that Pennsylvania is significantly behind in its nutrient reduction targets for agriculture, further elevating the need and opportunity for dairy cooperatives and processors to provide critical leadership. Pennsylvania will need to reduce nitrogen by over 19 million pounds statewide, with 16.6 million pounds coming from the agriculture sector. Two counties in Pennsylvania account for half of the needed agricultural nutrient loss reductions—Lancaster and York—followed by Lebanon, Franklin and Chester.
- Set a goal to have a high percentage of your farmers participating in a continuous improvement program. In the Smithfield Foods example, the company worked with EDF to set a goal of having 75 percent of the feed grains sourced for its hogs produced under sustainability programs. The company committed to tracking progress toward this goal over time. Track the number of farmers and/or percentage of acres of feed and forage production participating in sustainability programs and adopting priority practices.
- Review resources on goal setting provided by Ceres.
- National Academy of Sciences has recommendations for setting water quality goals.

Identify the key metrics you want to track and a program or process to collect, aggregate and manage data to track progress against those metrics (likely through the ag service professionals working directly with the farmers) to track and document participation, changes in farm management and outcomes.



Options for metrics to track progress

Metrics or indicators are critical for evaluating the effectiveness of your strategy, tracking progress toward your goal, and communicating progress to important stakeholders, in particular member or supplying dairy farms, customers and consumers. We recommend you use metrics that track activities, which tends to be easier, as well as metrics to track outcomes and impact, which can be more challenging. In addition, different metrics may be more meaningful for different audiences. For example, progress in acres of adoption likely will be important to all audiences. Supplying dairy farmers will also be very interested in economic cost and benefit of those farm improvements, while food company customers and consumers may be particularly interested in the outcomes for water quality.

We recommend having a conversation with your key audiences about what metrics under consideration are most meaningful to them. This way you can ensure you communicate your progress in ways that are meaningful to your most important stakeholders. Regardless, the metrics should provide you with a clear way to track progress against your goals, discussed above. Evaluating options for metrics is a great place to pull in some experts in this arena, such as conservation organizations, Extension, university experts or other science institutions listed above under setting goals.

Examples of activity metrics include:

- Number or percent of member or supplying dairy farmers participating in sustainability programs that prioritize adoption of nutrient (commercial fertilizer and manure), soil management, and other water quality practices such as buffers and wetlands. Collect data to track progress.
- Acres of key water quality practices adopted by participating farmers (i.e., practices that encourage the right rate, right timing, right form and right placement of nutrients—4Rs; cover crops; conservation tillage; buffers and increased crop diversity) and miles of stream excluded from livestock with managed riparian buffers.

Examples of impact metrics include:

- The amount of nutrients and sediment removed or prevented from being released into the environment, including reduction in nutrient and phosphorus loading to water, which can be estimated using a model such as the Chesapeake Bay Model. To enable stakeholders and partners to access components of the Bay Model to assess the benefits of changes in their sourcing or membership areas based on practice changes, the Chesapeake Bay Program created the Chesapeake Assessment Scenario Tool. To use this tool, you need to know the implementation levels of the specific practices at a county scale or at a watershed scale. The website provides user webinars and tutorials.
- Indicators tracked by the Chesapeake Bay Program, including salinity, nutrient loads, dissolved oxygen levels and benthic species abundance. Tracking these indicators would require partnership with a non-governmental organization, university or government entity with water quality monitoring expertise and capacity.

Developing a water quality program is not all or nothing and does not happen overnight. Phase-in the program, both in terms of components and in terms of the number of farmers involved.

Develop a plan to evaluate progress, fine-tune and scale the program

Developing a water quality program is not all or nothing and does not happen overnight. Trying to roll out a full program to all your farmers at once would be challenging and daunting. Instead, develop a plan to phase-in the program, both in terms of components and in terms of the number of farmers involved. Your goals should reflect how you decide to phase-in the program.

Here are some ways you can phase-in your program:

- Roll out the program in phases across all farmers.
  - Begin in year one with the baseline assessment and outreach to farmers about the purpose and goals of the water quality program you are launching.

Ways to incentivize farmer participation

An important consideration in rolling out a program is how to incentivize participation. In addition to connecting farmers to state and federal cost-share programs, cooperatives and processors also have the ability to reward participation economically or through contract relationships or membership benefits. A good example of the power of market-based incentives is the dramatic improvement in milk quality resulting from incentives built in by processors and cooperatives based on somatic cell count (SCC). Industry players introduced higher premiums for dairy farmers who produced milk with lower SCC, to the point that higher milk quality is a business norm.

This same concept could apply to water quality, with premiums provided to farmers who achieve a designated level of conservation performance, including but not limited to having and fully implementing required conservation, nutrient and manure management plans. Especially in today's economy and low milk prices, a boost in a milk check would provide a powerful motivator to implement and maintain key improvements.

- Follow that in year two with a focus on getting farms to have required plans in place and identify the low hanging fruit practices to implement first (depending on the size of your cooperative or processing company, this may require more years to get all plans).
- In the following year, have each farm implement one new practice that improves water quality and develop plans for adopting additional key practices in future years. This way, farmers can tackle the changes in their farm management in a phased and doable way. Consider encouraging farmers and their ag service professionals to tackle lower cost, easier to implement practices first, such as improved manure management or testing out cover crops on a field, before tackling more costly practices such as buffers or expanded manure storage.

- Roll out the program with an initial, pilot group of farmers and then grow.
  - Identify an initial group of farmers to have a test run of the program—a cluster of farmers in a specific area or a group of progressive, interested farmers who volunteer to pilot the program. This group could provide rapid feedback on how to fine-tune the program.
  - Incorporate those learnings and expand the program to additional groups of farmers. Set goals for a number or percentage of farmers to enroll each year.

These are just two examples of how you can roll out the program to avoid being overwhelmed yourself or overwhelming your farmers or partners.

Each year, make time to convene or get input from the key stakeholders involved in the program—staff, consultants, leading farmers, ag service professionals and any partnering organizations—to review how the program is working, identify problem areas, identify changes to further improve the program and set plans for the following year. This will help you stay on track, troubleshoot challenges on a regular basis, and get feedback from farmers and others.

STEP 3. Develop or select a data collection platform or process for tracking progress (cooperative- or processor-focused step)

Collecting and analyzing data is essential to success. Data will help you prioritize your efforts for maximum impact and efficient use of time and resources, identify the most valuable improvement options, and give meaning and credibility to the sustainability story you tell your buyers, consumers and stakeholders. You will need select an off-the-shelf commercially

Collaborate for improved water quality

Especially in challenging economic times with low milk prices, helping your farmers access resources for planning and practice implementation is very important, both for success and morale. Advancing a water quality program should be a collaboration, involving the cooperative or processor, the farmer and their ag service professionals, as well as others who can provide assistance such as grower associations or non-governmental organizations. Helping farmers access cost-share and other financial incentives will show them you are investing in their success along with that of the cooperative or company.

You do not need to go down this path alone, however. Navigating the many assistance programs can be time consuming and complex. Seeking out a partner to help coordinate and bring in support for program implementation can ease the burden on your cooperative or processor staff and provide access to people with extensive expertise and experience working with cost-share and grant programs. These organizations in the Chesapeake Bay include EDF, Lancaster Farmland Trust, Chesapeake Bay Foundation, Alliance for the Chesapeake Bay, The Nature Conservancy, Cooperative Extension, conservation districts and local watershed associations.

available data management platform or develop your own (this is much harder) to collect and manage the key data points for participating farms. It is important to collect data on management choices, acres of practices implemented and programs in which farmers are participating. The data collection and management process should anonymize individual farmer names and personal information while enabling aggregate reporting of key metrics (participation, acres of key practices, etc.) to your members, consumers, buyers and the public.

Data management resources

- Whole Farm Mass Nutrient Balance Calculator and additional resources.
- Farmer reviews of farm business data collection and analysis platforms collected by Precision Ag Reviews.

STEP 4. Develop an on-farm continuous improvement program for your participating farmers and their advisers (farmer engagement-focused step)

A critical step to helping your farmers and their ag service professionals make progress on water quality sustainability and resilience is to communicate your expectations to them and provide guidance and support for their participation. Sustainable management for water quality outcomes is not a line in the sand but a journey of continuous improvement. Your goals and plans should outline clearly for farmers what that pathway looks like—the key practices in the toolbox, how to progress from one level of performance to the next, how they can work with their ag service professional to ensure the pathway works for them, and what benefits they should expect from participation. Identify priority conservation programs and management practices that address water quality challenges in your sourcing areas.

Below, we have outlined the important steps and provided a model on-farm program as an example.

Connect to farmers' ag service professionals

Working with, and through, your farmers' ag service professionals will significantly enhance engagement with farmers and secure long-term success. You will want to involve the people your farmers rely on for guidance when it comes to what practices to implement and how

to pay for those practices. This includes an array of agricultural service providers, including agronomists, crop or ag consultants, ag retailers, conservation districts, nutritionists, Extension and university experts and USDA's NRCS staff, as well as the farmer's banker and accountant. You will not need to interact with all of these advisers, but they represent key players in the farmer's team of advisers.

Work with your staff and trusted experts to develop a way to identify the leading ag service professionals working with your member or supplying dairy farmers and develop ways to communicate with those advisers. To identify the ag service professionals, talk with your staff who work regularly with farmers or survey a representative sample of your member or supplying dairy farmers. Once you have a list of these ag service professionals, develop communications channels with those advisers based on their preference for email, phone, text or other. We recommend you meet with the advisers, as a group or individually, to share with them your goals and the role you hope they will play in working with the farmers to implement and track progress.

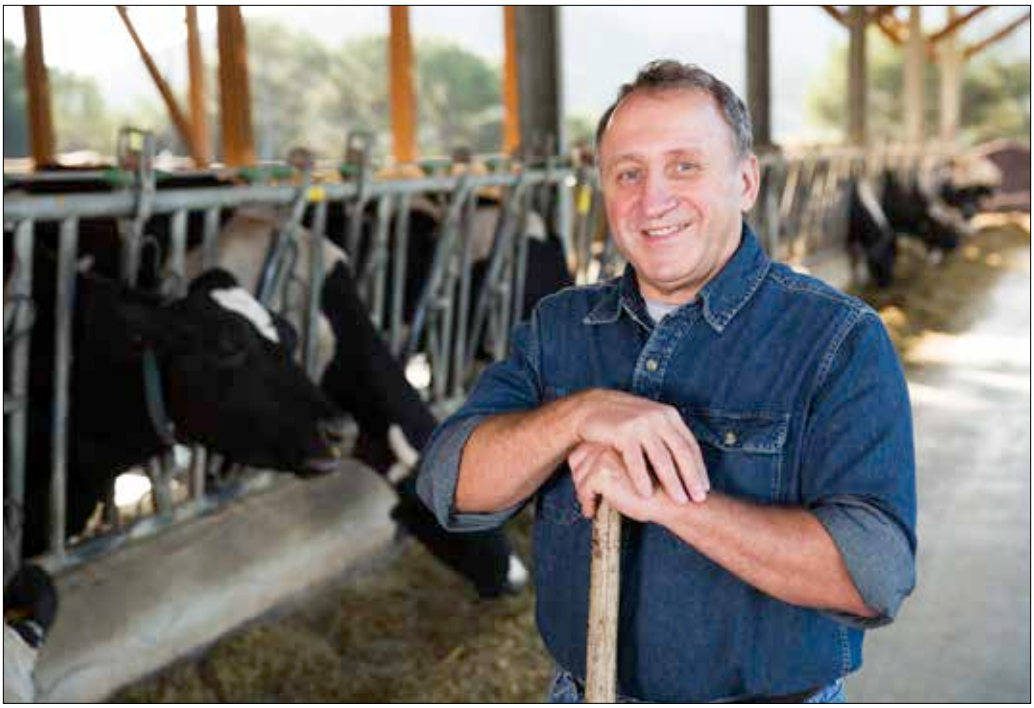
This relationship and communication with your member or supplying dairy farmer ag service professionals is very important, as it is through those advisers that the following steps are possible. The ag service professionals will be the ones who bring the program to the farmers and work with them to implement improvements.

Identify priority management approaches that are most useful for improving water quality while supporting productivity.

Use the model on-farm dairy water quality program or build your own

We have created a model on-farm dairy water quality program (Section 4, page 21) for continuous improvement for water quality that you can provide to your member or supplying dairy farmers and their advisers to help them prioritize and implement key management practices and create a process for tracking progress. You can use this model program with your farmers and their advisers as is, adapt it to meet your approach, or develop a different program tailored to your needs.

Working with experts on your staff and the key farm advisers in your sourcing and membership area, identify priority management approaches most useful for the area to improve water quality while supporting productivity (e.g., cover crops, optimize nutrient management, reduced tillage, crop rotation, etc.). Establish an inventory of the programs offered by ag service



providers that help farmers assess and adopt improved management practices. Ideally, programs will be available to many producers and designed to address priority resource concerns—in particular, minimizing the loss of soil and nutrients from fertilizer and manure, and improving soil quality and resilience—while supporting continuous improvement.

Included in Section 4 (page 21) is a list of additional resources to share with your supplying/member dairy farmers and their advisers.

Identify and share with farmers available programs and resources in the local area

Being able to direct your farmers and their ag service providers to sources of financial assistance will help them get access to needed resources and ensure they understand your commitment to their success. You can do this by developing an overview or listing of the institutions, tools, advisers and sources of financial assistance available in the area. We have provided example farmer support and assistance resources in Pennsylvania, Maryland and Virginia (Section 5, page 28) that includes both sustainability programs provided by ag service providers, such as ag retailers or crop consultants, and financial assistance available through voluntary conservation cost-share programs provided by USDA or a state agency. A great resource in the future will be Sustainability Programming for Ag Retailers and CCAs (SPARC) and the Pennsylvania 4R Alliance. These two programs train farm advisers to put sustainability to work on the ground with farmers and highlight available programs and providers.

A powerful way to incentivize farmer participation is to develop a recognition program to showcase and reward farmers and farm advisers for excellence in sustainability.

STEP 5. Encourage and recognize farmer participation and communicate results (farmer engagement-focused step)

In addition to general and targeted communications to tell your company's story and that of your supplying or member farmers, a powerful way to incentivize farmer participation is to develop a recognition program to showcase and reward farmers and farm advisers for excellence in sustainability.

Recognition program components

- Annual awards program for participating farmers making the greatest improvements or achieving the highest levels of management as defined by the program.
- Farm signs recognizing excellence in sustainability or participation in a program.
- Economic benefits like longer-term contracts or reduced waiting times for grain farmers at the grain mill.
- Discounted or free trials for use of innovative tools or technologies.
- Subsidized access to farm management software.
- Other ideas recommended by the farmers themselves.

Example programs

- Smithfield Foods created a program to support farmer adoption of conservation measures, helping hundreds of grain farmers implement cover crops, improve nutrient use efficiency using nitrogen sensors and other innovations, and other conservation practices across more than 400,000 acres since 2014, primarily in the Southeast and now the Midwest. Smithfield's on-staff agronomists travel to grain farms, demonstrating adaptations that will improve fertilizer usage and crop production. Smithfield applied for and received an award from USDA's Regional Conservation Partnership Program (RCCP) to secure financial assistance for participating farmers.

- Unilever has helped farmers in their sourcing regions evaluate environmental performance using the FieldPrint Calculator, collaborated with the Iowa Department of Agriculture and Land Stewardship to provide financial assistance to farmers to adopt cover crops, and highlighted farmer success stories on their website.
- Pennsylvania Department of Agriculture is in the process of developing a program called Pennsylvania Agriculture Conservation Stewardship, which is expected to highlight outstanding farms with a high level of environmental performance, designating them as "Green Farms Certified." The program aims to provide a variety of benefits to farmers who achieve certification, including agency recognition, reduced inspection frequency, farm signs, marketing opportunities, reduced paperwork for grant applications and easier access to nutrient trading opportunities.

For additional examples of recognition programs see:

- U.S. Dairy Sustainability Awards Program.
- Field to Market Farmer Spotlights Program.
- PA Association of Conservation Districts Clean Water Farm Award.
- American Dairy Association North East has the Dairying for Tomorrow Awards, which include an environmental category.

SECTION SUMMARY

The key steps for a cooperative or processor are:

STEP 1. Determine your starting point.

- Identify your sourcing footprint. This is the location of the majority of member or supplying dairy farms and millsheds from where those dairies source grain not produced on farm. A millshed is the area around supplying feed mills.
- Identify your starting point on sustainability, or baseline.

STEP 2. Identify goals and desired outcomes.

- Select a process to determine your goal and the outcomes you want.
- Develop a plan to evaluate progress, fine-tune and scale the program.

STEP 3. Develop or select a data collection platform or process for tracking progress.

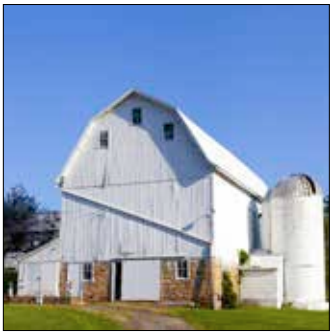
STEP 4. Develop an on-farm continuous improvement program for participating farmers and their advisers.

- Connect to farmers' ag service professionals.
- Create a continuous improvement program to be delivered via farmers' ag service professionals for farm-level conservation improvements that in aggregate will deliver on your cooperative or processor sustainability goals for water quality. You can use or adapt our model farm level program or develop your own.
- Identify and share with farmers and their ag service providers the available programs and resources in the local area.

STEP 5. Encourage and recognize farmer participation and communicate results.

- Identify ways to communicate progress and success to your farmers, buyers and the community.
- Identify or establish ways to motivate and reward participating farmers.

3. Tell your story



Sustainability stories are most powerful when backed up by hard data that validates progress and impact.

After all this work, be sure to tell your story. Communicating your commitment, actions and progress is a powerful way to catalyze further improvement across your supply chain. Stories are most powerful when backed up by hard data that validates your progress and impact.

Effective communications begin with determining the key audiences that you want to reach, then identifying the most effective messages, tools and tactics to reach them. Your audiences may include farmers in your supply chain, ag service professionals in your sourcing regions, food companies and retailers that buy your products, and consumer, health and watershed organizations. Press announcements, annual report updates, conference presentations and social media posts can all be effective ways to reach your audience and communication goals.

How to communicate your commitment, actions and progress

Possible communications activities	Details
Announce collaboration: • Distribute press release. • Promote release to reporters and offer appropriate spokespeople for interviews. • Promote announcement on social media.	Distribute press release highlighting collaboration and role of partners and farmers; pitch release to ag trades and food/ag reporters; and post tweets highlighting the news. Work with partners to distribute news release in targeted sourcing areas.
Highlight collaboration in annual reports.	Work with company communications team to recommend sustainability program and collaboration for inclusion in the co-op or company's annual report.
Speak at stakeholder events/thought leadership opportunities.	Work with partners to pitch program leaders and participants for participation in panels or as speakers for local, regional or sector events. In the Chesapeake Bay, these would include the Keystone Farm Show, ag and dairy association events or other farmer meetings, Chesapeake Watershed Forum, Choose Clean Water Coalition annual meeting and the Upper Susquehanna Watershed Forum.
Create agreed-upon collaboration messaging to facilitate communications.	Develop agreed-upon talking points and quotes that the co-op or company as well as partners can use in outreach and marketing.
Ongoing media outreach	Pitch collaboration and goals in regular earned and incoming media outreach.
Website content	Publish language about the collaboration on cooperative or company website.
Blogging	Include information on sustainability program and partnership in blogs or newsletters.
Social media promotions	Send out tweets on program and collaboration.
Multimedia development	Coordinate development of videos/photos to highlight participating farmers.

Three key considerations for strategic communications

Who do you want to reach?	What messages do you want to deliver to them?	How can you best reach your audience?
Dairy farmers	Sustainability is good for business.	Newsletters, farmer stories on website
Ag service providers	Here are BMPs that farmers find valuable. Here are resources for helping farmers enhance water quality.	Stakeholder events Local newspapers
Food companies	We are making real progress toward meeting water quality goals.	Company or co-op annual or other reports, videos of farmer success stories, media, direct outreach to your sustainability or other contacts at food companies
Watershed organizations, conservation organizations and the community.	We are making real progress toward meeting water quality goals.	Newsletters, stakeholder events, local newspapers, farm field days

What can you do through your communications? Here are some valuable options:

- Communicate to member or supplying farmers, grain and dairy, the value of sustainability and continuous improvement for their own farm resilience and economic success, as well as for downstream supply chain players and their local community.
- Communicate to the public about improvements and excellence in dairy and feed grain production and the value of collaboration across the dairy supply chain.
- Promote local partners, including the ag service professionals working with the farmers and any nonprofit organizations, conservation districts or others playing a key role.
- Share farmer success stories to encourage broader participation and greater understanding of the sustainability efforts of the dairy sector and your own cooperative or company.
- Encourage ag service providers in the area not already providing quality sustainability services to develop them. Ensure sustainability programs collect and share aggregated data or tracking participation and improvement.

SECTION SUMMARY

Communicating your commitment, actions and progress is a powerful way to benefit from progress and catalyze further improvement across your supply chain. These stories are most powerful when backed up by hard data that validates the progress and impact.

Key audiences include dairy and grain farmers in your supply chain, ag service professionals working in your sourcing regions, food companies and retailers who buy your milk and dairy products, watershed organizations, consumers and health professionals. Some tools for effective communications include releasing press announcements of key collaborators involved in your program; sharing highlights in company annual reports; speaking at stakeholder events; posting updates, overviews and farmer stories on your website; sharing updates via blogs or social media; and creating videos of farmer success stories.

4. Model on-farm dairy water quality program

Ag service professionals will bring water quality programs to farmers and help them implement improvements.

The purpose of this model on-farm dairy water quality program is to give an example of what you can provide to farmers and their ag service professionals to advance changes at the farm level.

Implementation of a program like this across your member or supplying dairy farms, in aggregate, will enable you to reach your sustainability goals and improve the resilience and long-term productivity of the farms in your supply chain.

STEP 1. Connect to farmers' ag service professionals

As discussed above, we strongly recommend including the ag service professionals working with your member or supplying farmers in using or adapting this model farm-level dairy sustainability program. Involving the people your farmers work with most routinely for crop and barnyard management will significantly increase success. If those advisers do not yet have sustainability expertise, recommend they get some training through the PA 4R Alliance, PA No Till Alliance, Sustainability Programming for Ag Retailers and CCAs (SPARC), the American Society of Agronomy, their local conservation district or Penn State University.

Key first steps are to identify the leading ag service professionals working with your member or supplying dairy farmers and develop ways to communicate with those advisers. To identify the ag service professionals, talk with your staff who work regularly with farmers or conduct a brief survey of your member or supplying dairy farmers. Once you have a list of these ag service professionals, develop communications channels with those advisers, including email, phone and/or text. We recommend you meet with the advisers, as a group or individually, to share your goals and the role you hope they will play in working with the farmers to implement and track progress.

This relationship and communication with your member or supplying dairy farmer ag service professionals is very important, as it is through those advisers that the following steps

Communicate value proposition to farmers

You can significantly enhance farmer participation by communicating the value of participating: the economic value of many conservation practices; the value of better sustained yields over time and in the face of challenging weather; the ability to alleviate concerns or pressure from regulations; the opportunity to boost community perceptions of agriculture; and the opportunity to solidify their good standing in a marketplace increasingly interested in sustainability.

Equally important, especially in times of low milk prices, will be helping farmers access cost-share and other financial assistance programs. Partnering with a grower association or non-governmental organization with experience sorting through and accessing those programs can ease the stress on your cooperative or processor staff and help you advance your program overall.

happen. The ag service professionals bring the program to those farmers and implement it over the upcoming years.

STEP 2. Assess current on-farm management

This evaluation step brings the evaluation done at the overall sourcing level in Section 2 (page 10) down to the farm level. Working with your staff who work directly with farmers and the ag service professionals identified in Step 1 above, use your survey or other process provided by the farmer's ag service professional to assess the current sustainability status of participating farms.

Survey current management practices

- Does the farm have a current nutrient management plan? Here are the formats for Pennsylvania, Maryland and Virginia.
- Does the farm have a current soil conservation plan? Here are resources for Pennsylvania, Maryland and Virginia
- Does the farm have a current manure management plan? Here are resources for Pennsylvania, Maryland and Virginia.
- Has the farmer considered or is he/she implementing key conservation measures: adaptation of nutrient management to improve rate, timing, form and placement; adoption of cover crops; reduced or no tillage; adding more crops to the rotation to increase diversity and resilience; and fencing and/or buffers along waterways?

In addition to assessing whether these plans are current, it is important to ask the question about how useful they are. Are they sitting on a shelf or actually helping guide implementation and continuous improvement? If they do not seem useful or are difficult to implement, encourage the farmer to work with his/her adviser to determine how to make them more useful,

in particular by breaking them down into priority steps—which changes in farm management does the farm need most and which are doable now? The detailed farm-level water quality programs below, which cover crop production and barnyard management, can be a guide for this assessment and prioritization.

STEP 3. Planning and implementation

With the assessment in hand, the farmer should work with his/her adviser to identify priority nutrient, soil and/or manure management areas for improvement. To tackle the diversity of improvements needed on the farm, the farmer and adviser should break that list down into manageable pieces. Have them start by identifying priority improvement practices to implement first and one additional practice or tool of interest to test on one field or part of a field or in a strip trial. Then they can move on to implementing the plan in the following growing season. Be sure they collect data to continue to monitor management and improvements. The farm-level water quality programs for crop production and barnyard management provide a guide for planning and implementation.

Finding the right tools, technologies and products that can help improve nutrient use efficiency can be challenging. Information resources such as NutrientStar and Newtrient can help sort through the growing diversity of options companies are marketing to farmers.

In order to effectively track what is happening on your farm, and to tell your sustainability story in a persuasive way, you need to be collecting key pieces of data about crops, soil and nutrient management. The importance of data collection and some recommended options are included in Section 2, Part 4 (page 15).

Collecting and analyzing data about crops, soil and nutrient management is essential to success.

STEP 4. Evaluation and continued refinement

At the end of the year, have the farmer and adviser evaluate what worked well and what did not work well in the past growing season. Identify refinements to the plan and one or more new practices to evaluate or adopt. Ensure they continue to collect data to monitor management and improvements. The farmer and adviser should repeat this step of evaluation and refinement each year to find the best mix of practices and tools for economic and environmental resilience and sustainability.

STEP 5. Share resources

Sharing resources with your members, supplying farmers and farmers' advisers will help encourage continual improvement.

Technical assistance and farmer engagement resources

- *Farmer Network Design Manual*, written by and for farmer network practitioners, to guide creation and management of farmer networks as a way to engage farmers and ag service providers in improving farm management, greater farm profits, and increased farm productivity and sustainability. The manual provides a comprehensive look at designs, funding, structures and benefits of farmer networks that can help guide decisions about forming a farmer network.
- USDA's NRCS is the principal agency for providing conservation technical assistance to private landowners. NRCS delivers conservation technical assistance through its voluntary Conservation Technical Assistance Program (CTA). CTA is available to any group or individual interested in conserving natural resources and sustaining agricultural production in this country.

Nutrient use efficiency and soil health resources

- 4R Nutrient Stewardship program, hosted by The Fertilizer Institute, provides a framework to achieve cropping system goals, such as increased production, increased farmer profitability, enhanced environmental protection and improved sustainability. The 4R concept incorporates the right fertilizer source, rate, time and place to optimize the use of nutrients in crop production.
- Chesapeake 4Rs Alliance is a collaboration among the Maryland and Delaware agricultural industry, academic institutions, environmental organizations and government entities to advocate for, and facilitate, the implementation of 4R best management practices for all plant nutrient application.
- Pennsylvania is in the process of launching its own 4R Alliance.
- NutrientStar is a program that conducts independent, third-party assessments of nutrient efficiency tools and products. This resource can help farmers and their advisers evaluate which nutrient use efficiency innovations could provide value in their efforts to improve efficiency and reduce nutrient loss.
- Newtrient, which partners with dairy farmers, technology providers and other stakeholders to help them make informed decisions regarding manure management opportunities and challenges.
- The Soil Health Partnership (SHP)is a farmer-led initiative to foster transformation in agriculture through improved soil health and a stable food supply thus benefiting farmer profitability and the environment. SHP is an initiative of the National Corn Growers Association that brings together diverse partner organizations including federal agencies, universities and environmental groups to work toward the common goal of improving soil health. SHP has a network of more than 100 farmers in 12 states, mostly in the Midwest, testing practices that can improve soil health.
- Pennsylvania No-Till Alliance is a farmer-led outreach initiative that supports farmers and their advisers in transitioning to soil health practices that support water quality improvement and on-farm profitability.

USDA Conservation Technical Assistance is available to anyone interested in conserving natural resources and sustaining agricultural production.

Business management resources

- PA Center for Dairy Excellence is a non-profit organization created in 2004 to enhance the profitability and viability of the dairy industry, the leading sector of Pennsylvania's number one industry: agriculture.

University and Extension Programs

- Virtual Dairy Farm/Sustainable Dairy Project examines dairy production systems across the Great Lakes, looking at options to reduce carbon footprint and environmental impact without sacrificing productivity or profit. The website shows typical dairy farming practices for two major sectors—farms with about 150 cows and farms with 1,500 cows. The site allows the visitor to examine each system and how its components affect the operation's carbon footprint. Staff from the University of Wisconsin, Penn State University and Cornell University developed the site.
- Penn State University's Dairy and Animal Science program on Nutrient Management and Environmental Stewardship.
- University of Maryland Cooperative Extension Environment and Natural Resources program.
- Virgina Tech's Dairy Extension program.
- Cornell PRO-Dairy program includes both environmental and business management resources.

Survey and measurement resources

- Field to Market's Fieldprint® Platform is an online assessment tool that enables brands, retailers, suppliers and farmers to measure the environmental impacts of commodity crop production and identify opportunities for continuous improvement.
- The National Milk Producers Federation FARM Environmental Stewardship Assessment focuses on collecting and sharing information on greenhouse gas emissions and energy use on dairy farms. The assessment helps dairy producers to identify potential efficiency gains and cost savings, and to track progress in a secure, confidential platform.

Example practice framework for crop and forage production

Because every farm is unique, sustainability cannot be a one-size-fits-all prescription. Below is a sample program for key best management practices (BMPs) to consider as you and your adviser work through the above steps.

Priority nutrient use efficiency (NUE) BMPs

- Develop a base nutrient management plan (NMP)
- In that base NMP, use a science-based process for determining rate. Options include but are not limited to: land-grant university recommendation, on-farm trials to determine economic optimum rate, stalk nitrate or tissue testing to evaluate and set rate, N decision support tool to determine rate, field history of yields from which an N recommendation is made based on yield goal system (use of land-grant university recommended rate preferred).
- Develop a testing protocol for manure, soil, crop tissue and forages to evaluate and adapt rate, timing, form and placement of nutrients going forward.

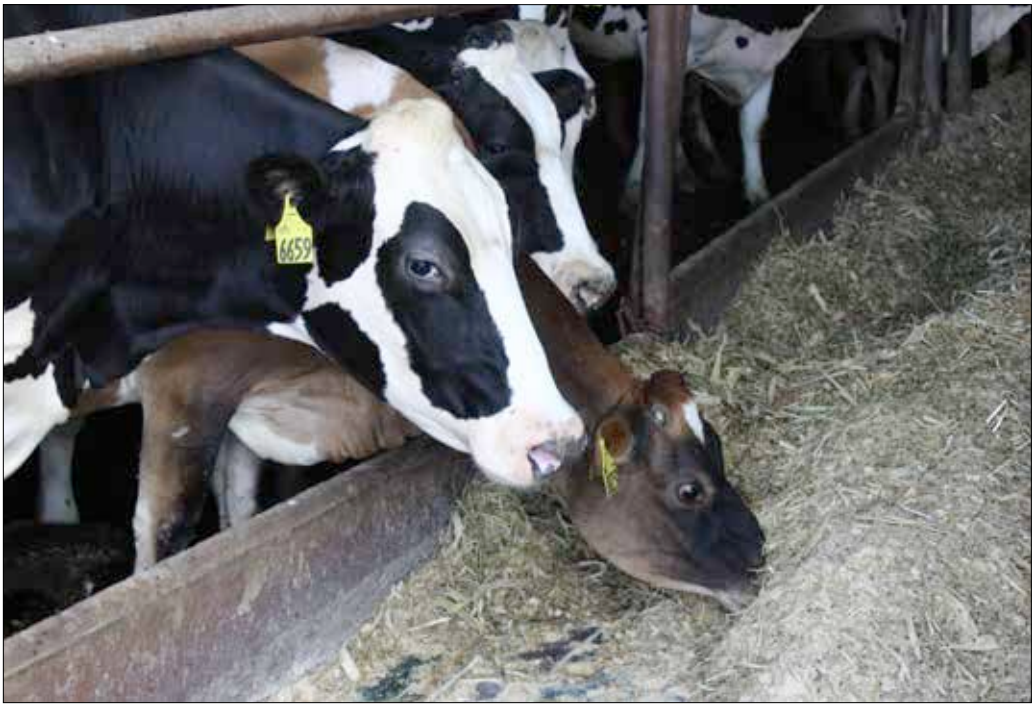
Identify at least one improvement practice to implement in this season or the next

- Avoid applying most/significant N in the fall.
- Split spring applications of N.
- Swath/section control (reduce effects of overlapping applications in a field).
- Nitrogen stabilizer (see NutrientStar for guidance).

Continuous NUE improvement

Test or implement at least one new NUE practice every one to two years for continued improvement

- Improved integration and crediting of manure in crop nutrients.
- Incorporation of manure.
- Following recommendations using N modeling tool (see NutrientStar for guidance).
- Tissue analysis to evaluate and refine rate.
- Develop and implement a plan based on zone management.
- Drone NDVI sensing and N recommendations.
- Optical sensor technology and variable rate application (see NutrientStar for guidance).
- Manure additives.



Priority soil health and edge of field BMPs for feed/forage production

Test and consider adopting additional water quality practices

- Cover crops.
- Conservation tillage or no till.
- Soil health analysis.
- Add additional crop to rotation (or more).
- Wetland (designed/placed to intercept water flow from field/farm).
- Riparian buffer (designed/placed to intercept nutrients/soil).
- Forested buffer (designed/placed to intercept nutrients/soil).
- Use of evaluation tool to identify unprofitable/high risk areas in field (i.e. AgSolver).

Example practice framework for barnyard and manure management

- Evaluate manure/barnyard management, pasture management, commodity storage and management, storm water and mortality management. Identify any problem areas on the farm.
- Assess status of manure balance or excess. Develop plan to export or find alternative uses for excess beyond what the farm can use appropriately in feed/forage production.
- Evaluate manure management: storage needs, barnyard management, fencing, application practices, excess manure and need to export.
- Develop and implement plan for making improvements.
- Evaluate plan annually to continue to refine and identify opportunities for further improvement.

SECTION SUMMARY

The purpose of this model on-farm dairy water quality program is to give an example of what you can provide farmers and their ag service professionals to advance changes at the farm level. The benefits to farmers are numerous: economic value of many conservation practices; value of better sustained yields over time and in the face of challenging weather; ability to get out from under concerns or pressure from regulations; opportunity to boost community perceptions of agriculture; and opportunity to solidify their good standing in a marketplace increasingly interested in sustainability. It is important to help farmers access cost-share and other financial assistance programs. Grower association or non-governmental organization can help navigate those programs.

STEP 1. Connect to farmers' ag service professionals

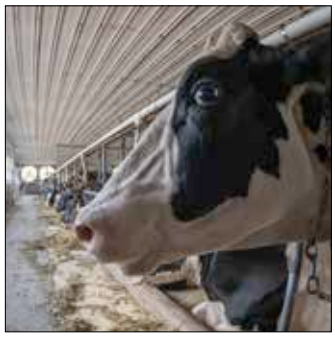
STEP 2. Assess current on-farm management: nutrient management plans, soil conservation plans, manure management plans and status of implementation of priority practices.

STEP 3. Planning and implementation: With the assessment in hand, the farmer should work with his/her adviser to identify priority nutrient, soil and/or manure management areas for improvement. Data collection to evaluate and track progress and benefits is key.

STEP 4. Evaluation and continued refinement: Evaluate what worked well and what did not work well in the past growing season. Identify refinements to the plan and one or more new practices to evaluate or adopt.

STEP 5. Share resources with farmers and their advisers: Resources should cover Technical Assistance, farmer engagement, nutrient use efficiency, soil health, business management, surveys and measurement, and university and Extension programs.

5. Farmer support and assistance resources in Pennsylvania, Maryland and Virginia



While tackling water quality may seem daunting, there are organizations and programs ready to help.

Below are a diversity of financial and technical assistance programs available in the Chesapeake Bay. For many of these programs, farmers will need help from an organization or your cooperative or processor to access them. Collaborators to help farmers access these programs beyond your cooperative or processor include local watershed associations, conservation districts, and township or conservation organizations.

Pennsylvania programs

Nutrient management assistance programs

Farmers who develop a nutrient management plan under Act 38 regulations may be eligible for financial assistance for development and implementation of the plan, provided funds are available. The point of contact is the local county conservation district office or the State Conservation Commission (SCC).

- **Plan Development Incentive Program:** Designed to assist existing operations in development of an Act 38 compliant nutrient management plan.
- **Plan Maintenance Program Funding:** As remains available, an operator may apply for funds to support continual plan amendments and updates.
- **Plan Implementation Financial Assistance:** Created by the SCC and PA State Treasury to help ag operations implement a nutrient management plan, including alternative technology projects. These funds are available in the form of grants or low-interest loans for NMP implementation through the Agriculture Land Investment Program (AgriLink).

PA Growing Greener grant program

Growing Greener Watershed Grants provide funding to clean up non-point sources of pollution throughout Pennsylvania. Examples of projects include acid mine drainage abatement, mine cleanup efforts, abandoned oil and gas well plugging and local watershed-based conservation projects. Counties, authorities and other municipalities; county conservation districts; watershed organizations; and other organizations involved in the restoration and protection of Pennsylvania's environment are eligible to apply.

Resource Enhancement and Protection (REAP) Program

- Through REAP, farmers, landowners and businesses earn tax credits for implementing "Best Management Practices" (BMPs) that will enhance farm production and protect natural resources.
- REAP is a first-come, first-serve program—no rankings. The SCC administers the program and the PA Department of Revenue awards the tax credits.

- Eligible applicants receive between 50 percent and 75 percent of project costs in the form of state tax credits of up to $150,000 per agricultural operation.
- Farmers can use the tax credits incrementally (as needed) for up to 15 years to pay PA state income tax. Farmers and landowners can elect to sell the tax credits after one year.
- Farmers can work with a sponsor that will help to finance the BMP project. The sponsor reimburses the farmer/landowner for the project installation costs and the sponsor receives the tax credits.
- Applicants can apply for proposed projects and/or completed projects.

Cooperatives, processors, watershed associations, townships, and conservation districts and organizations can help farmers access state conservation programs.

Maryland programs

Agricultural Certainty Program

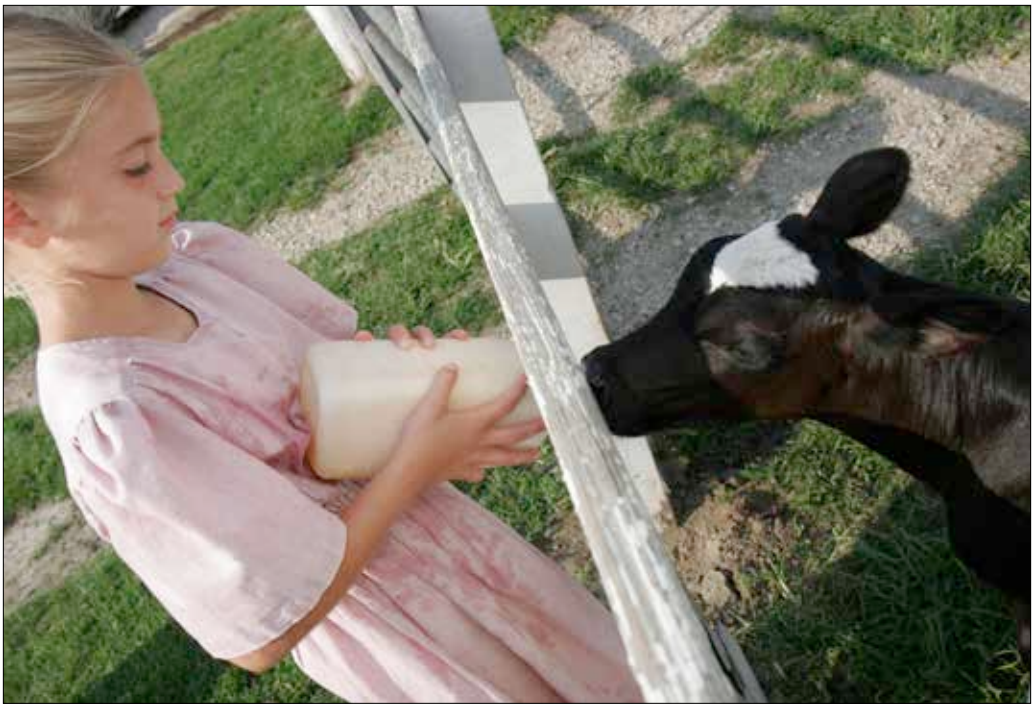
Created in 2013, the voluntary Agricultural Certainty Program gives participating Maryland farmers a 10-year exemption from new environmental laws and regulations in return for installing best management practices (BMPs) in order to meet local or Chesapeake Bay Total Daily Maximum Load goals ahead of schedule.

Maryland Agricultural Water Quality Cost-Share Program (MACS)

MACS provides farmers with grants to cover up to 87.5 percent of the cost to install conservation BMPs on their farms to prevent soil erosion, manage nutrients and safeguard water quality in streams, rivers and the Chesapeake Bay. Grassed waterways planted to prevent gully erosion in farm fields, streamside buffers of grasses and trees planted to filter sediment and farm runoff, and animal waste management systems constructed to help farmers safely handle and store manure resources are among more than 30 BMPs currently eligible for cost-share grants.

Cover Crop Program

Part of the MACS program, Maryland's Cover Crop Program provides farmers with cost-share grants to help offset seed, labor and equipment costs associated with planting cover crops immediately



following the summer crop harvest. Farmers may not harvest the cover crops, but they can graze them or chop them for livestock forage for on-farm use after becoming well established.

Agricultural Waste Technology Grants

Maryland Department of Agriculture's Animal Waste Technology Fund seeks to help farmers address manure management challenges, reduce on-farm waste streams, and find alternative uses for manure by creating marketable fertilizer and other products and by-products. Options include, but are not limited to, altering the nutrient content of organic nutrient sources, using manure for energy generation or developing new products that add value to improve farm viability.

Maryland Manure Transport Program

This program helps poultry, dairy, beef and other animal producers cover the costs of transporting excess manure off their farms. Animal producers with high soil phosphorus levels or inadequate land to spread their manure can receive cost-share assistance of up to $20/ton to transport excess manure to other farms or alterative use facilities that can use the product safely. To support Maryland's goal of transporting 20 percent of the poultry litter produced on the Lower Eastern Shore to other regions, cost-share rates are 20 percent higher for farms located in Dorchester, Somerset, Wicomico or Worcester counties.

Virginia programs

Virginia's Department of Conservation and Recreation administers programs through local soil and water conservation districts to improve or maintain water quality in the state's streams, lakes and bays through the installation or implementation of agricultural best management practices (BMPs).

The Virginia Agricultural BMP Cost-Share Program

The cost-share program supports the use of various practices in conservation planning to treat cropland, pastureland, hay land and forested land. Some are paid for at a flat rate or straight per-acre rate. Others are cost-shared on a percentage basis up to 75 percent.

The Virginia BMP Tax Credit Program

The Virginia Agricultural BMP Tax Credit Program began in 1998. It supports the voluntary installation of BMPs that support Virginia's nonpoint source pollution water quality objectives. Agricultural producers with a conservation plan approved by their Soil and Water Conservation District may take a credit against state income tax of 25 percent of the first $70,000 spent on agricultural BMPs. The amount of the tax credit may not exceed $17,500 or the total state income tax obligation.

USDA programs (available in each state)

Environmental Quality Incentives Program (EQIP)

EQIP is a voluntary conservation program for farmers and ranchers that promotes agricultural production and environmental quality as compatible national goals. EQIP offers financial and technical assistance to help eligible participants install or implement structural and management practices on agricultural land. Pennsylvania, Maryland and Virginia have identified additional EQIP priorities.

Conservation Stewardship Program (CSP)

CSP helps agricultural producers maintain and improve their existing conservation systems and adopt additional conservation activities to address priority resources concerns. Participants

earn CSP payments for conservation performance—the higher the performance, the higher the payment.

Agricultural Conservation Easement Program (ACEP)

ACEP provides financial and technical assistance to help conserve agricultural lands and wetlands and their related benefits. Under the Agricultural Land Easements component, NRCS helps Indian tribes, state and local governments and non-governmental organizations protect working agricultural lands and limit non-agricultural uses of the land. Under the Wetlands Reserve Easements component, NRCS helps to restore, protect and enhance enrolled wetlands.

Conservation Reserve Enhancement Program (CREP)

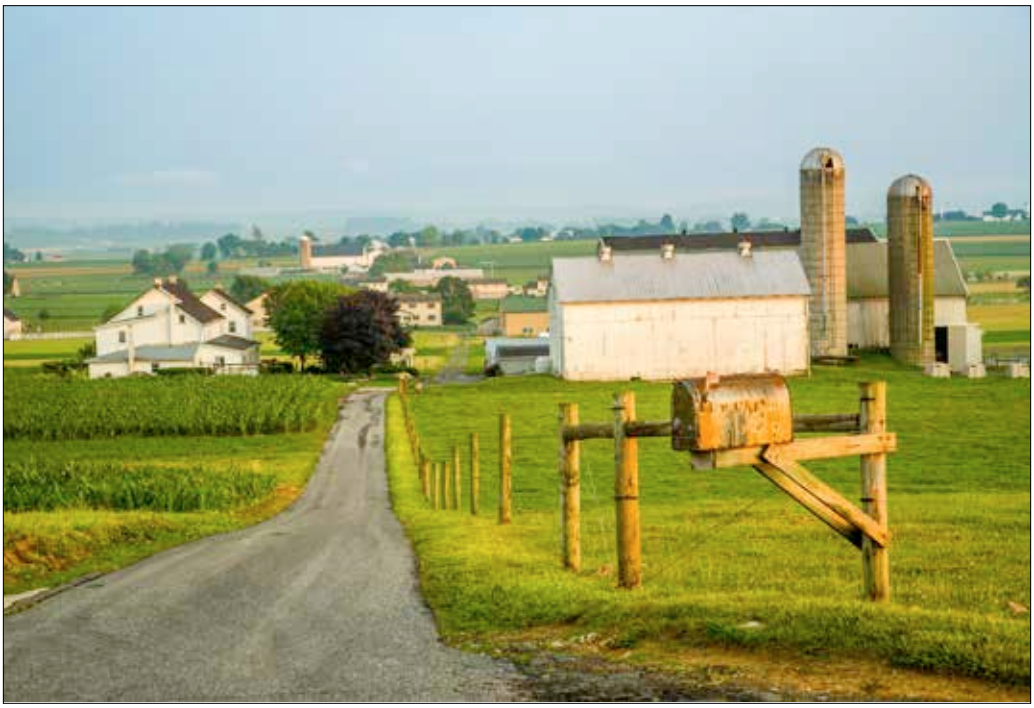
CREP is a voluntary land retirement program that helps agricultural producers protect environmentally sensitive land, decrease erosion, restore wildlife habitat, and safeguard ground and surface water.

Agricultural Management Assistance Program (AMA)

AMA helps agricultural producers use conservation to manage risk and address natural resource issues through natural resources conservation. NRCS administers the AMA conservation provisions, while the Agricultural Marketing Service and the Risk Management Agency implement other provisions under AMA

Conservation Innovation Grant Program (CIG)

CIG is a grant program to support public and private sector innovation in resource conservation. CIG uses EQIP funds to award competitive grants to non-federal governmental or non-governmental organizations, American Indian Tribes or individuals. Producers involved in CIG funded projects must be EQIP eligible. Through the CIG program, public and private grantees develop the tools, technologies and strategies to support next-generation conservation efforts on working lands and develop market-based solutions to resource challenges. A one-to-one match of non-federal funds is required.



Regional Conservation Partnership Program (RCPP)

RCPP supports partnership efforts with producers to increase the restoration and sustainable use of soil, water, wildlife and related natural resources on a regional or watershed scale. Through the program, USDA's NRCS and its partners help producers install and maintain conservation activities in selected project areas. Partners leverage RCPP funding in project areas and report on the benefits achieved. NRCS implements RCPP conservation program contracts and easement agreements through four existing NRCS programs authorities: ACEP, EQIP, CSP and the Healthy Forests Reserve Program.

Other support programs

- Grant programs from the National Fish and Wildlife Federation.
- EPA Watershed (section 319) grant program.

Maps of the water quality priority areas in the Chesapeake Bay

- EPA overview of ag and water quality.
- EPA delivered yield of nitrogen from agriculture.
- EPA delivered yield of phosphorus from agriculture.
- EPA priority agricultural watersheds.

Conclusion

Taking action on sustainability offers the dairy sector a way to improve its environmental and economic performance.

Agriculture, including the dairy industry, is vital to the Chesapeake Bay. It is important economically, culturally and environmentally. Being proactive in addressing one of the most pressing sustainability issues in the region—water quality—is important for the near- and long-term wellbeing of the dairy industry, the communities that depend on the sector and the quality of the region's natural resources.

The goal of this guide is to lay out why developing and implementing a water quality program is important to reducing risks to production and brand reputation, and how dairy cooperatives and processors can make goals, develop programs and engage their farmers to make measurable progress for business and environmental value. Taking action is essential if the dairy sector is to deal with difficult economics, continued water quality concerns locally and in the Chesapeake Bay, fears of further regulatory restrictions, increasingly negative portrayals in the media, and consumer and customer pressure to make sustainability improvements. Taking action on sustainability offers the dairy sector a way to address these challenges, improve its environmental and economic performance, and become more resilient.

While tackling water quality may seem daunting, there are organizations and programs ready to help. Using this guide, dairy cooperatives and processors of any size can move forward on water quality for economic and environmental value, even if they do not have the resources to hire expert consultants to lead them through the process. Hiring or having sustainability experts on staff has the benefit of bringing this capacity inside, but you can make meaningful progress working with quality consultants or non-governmental organizations. These can include non-governmental conservation organizations such as EDF, Alliance for the Chesapeake Bay, The Nature Conservancy, Lancaster Farmland Trust and others; grower and industry associations such as PennAg Industries, Center for Dairy Excellence or National Milk Producers Federation; or science organizations such as the Stroud Water Research Center or your land-grant university/Extension Service. The value of connecting to, and working with, the farm adviser and conservation experts known and trusted by your own staff and your supplying or member farmers cannot be overstated.

By reading this guide, you have taken the first step. We welcome an opportunity to help you put this guide to use to advance your water quality goals in collaboration with your farmers.

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